Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Issued July, 1929

FARM GRAIN STORAGE

LEAFLET NO. 46

U.S. DEPARTMENT OF AGRICULTURE

By E. G. Boerner, *Senior Marketing Specialist, Grain Investigations, Bureau of Agricultural Economics*, and M. C. Betts, *Architect*, and T. A. H. Miller, *Associate Agricultural Engineer, Division of Agricultural Engineering, Bureau of Public Roads*

The present practice of paying premiums for wheat containing a high protein content, and the increased use of the combine for harvesting grain in the grain-producing area east of the Rocky Mountains and particularly in the hard-red-winter and hard-red-spring wheat areas, has emphasized the need of more farm storage for grain.

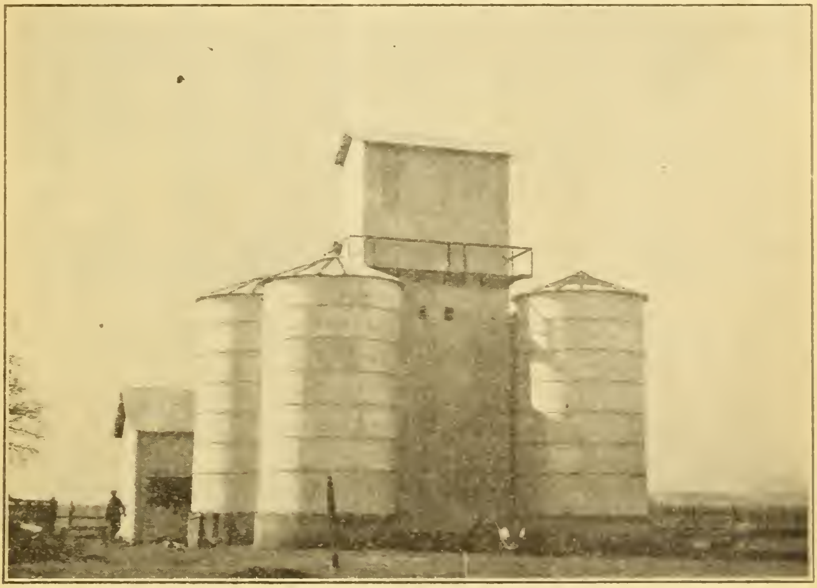

Figure 1.—A large grain storage consisting of four metal bins arranged two and two on either side of the elevator housing

The combine is used for harvesting each of the small grains, including wheat, rye, oats, barley, and flax, and it can be used for harvesting grain sorghums. In any given area in which these grains are produced, practically all of the grain of any one kind, as for instance wheat, matures at about the same time, and as it is advisable to begin the combine-harvesting operation as soon as the grain is in proper condition to be harvested by this method, the result is that a large volume of grain is being threshed during a comparatively short period of time.

In the hard-red-winter and hard-red-spring wheat areas, in which combines are at present most numerous and in which new combines are being introduced very rapidly, a large proportion of the wheat crop each year is being marketed during the early months of the new crop. As a result, the facilities of the country elevators and the railroads in these areas are crowded to the limit in handling the grain as rapidly as it comes from the farms. The crowded conditions under which the country elevators operate during the rush period usually makes it impossible for them to bin the wheat according to its protein content, or to condition, clean, and mix the grain to best advantage as rapidly as it is received from the farms and shipped to the terminal markets.

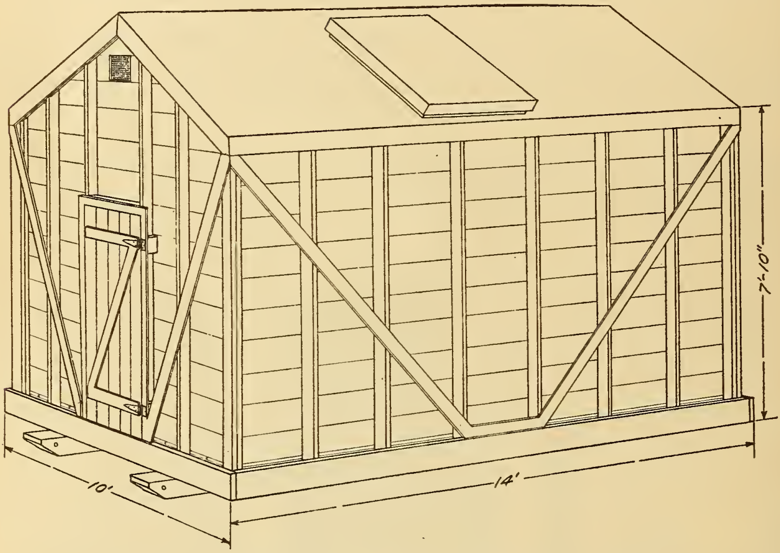

FIGURE 2.—Portable wooden grain bin holding 660 bushels

To prevent damage to the newly threshed grain from the weather, the grain must either be put into farm storage, or be immediately hauled to the local country elevators or mills, or it must be shipped direct to the terminal markets. To store at least a part of each newly harvested crop, in properly constructed grain bins on the farm, over the rush marketing period, has a number of advantages.

ADVANTAGES OF FARM STORAGE

Farm storage for grain will make possible a system of more orderly marketing, will prevent car shortage and shipping embargoes, will make it possible to handle the crop with less hired help, will make it possible to clean grain on the farm and at country elevators, will prevent the need of piling the newly threshed grain on the ground, will make it possible to condition damp grain before selling it on the market, and will make it possible for farmers to sell wheat on a protein basis.

FACILITATES ORDERLY MARKETING

Orderly marketing is desirable in that it prevents the market gluts and the frequently resulting temporary reduction in the price offered for the grain. It gives farmers an opportunity to study supply and demand conditions, to observe price trends, and to sell their grain on what they consider to be the most favorable market. This is particularly important in years of large crops in which there is also a large carry-over of grain from previous crops in store in elevators.

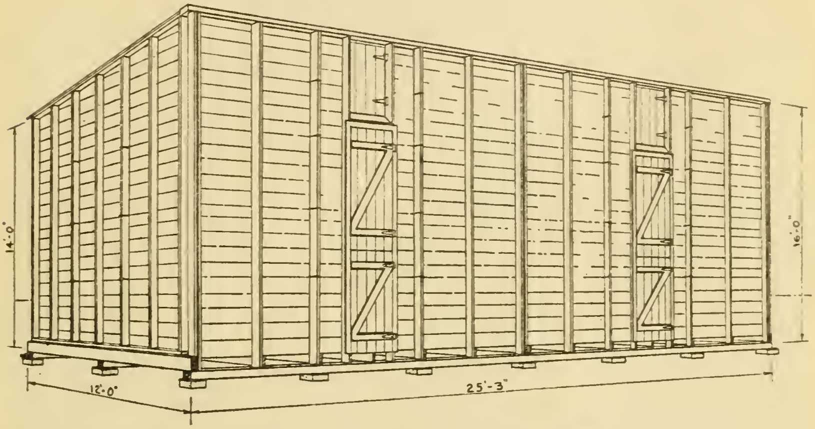

FIGURE 3.—Two-bin temporary grain storage of 2,600 bushels capacity. The construction is of wood of "knock-down" type which may be added to or taken down, the material being used for other purposes

PREVENTS CAR SHORTAGE AND EMBARGOES

On account of the enormous quantity of wheat that is shipped to the terminal markets during the rush period of the harvest, the railroads have difficulty in moving the grain as rapidly as it is delivered to them, and this sometimes causes temporary car shortages or embargoes at the terminal markets. If the farmers will place at least a part of each new crop in properly constructed farm storage bins, the railroads and the country and terminal elevator operators will be better able to handle and move the marketed grain as rapidly as it is delivered to them and can thereby prevent the car shortages and the embargoes.

REDUCES LABOR COST

If a farm is located at some distance from its local market it will require less help (which often is hired help) to move the grain from the combine or threshing machine to the farm bin than is required to haul the grain direct to the local market. Frequently one truck or team and one driver can haul the grain from the combine and place it in farm storage, when two or more trucks or teams and men would be required to haul it to market as fast as it is threshed.

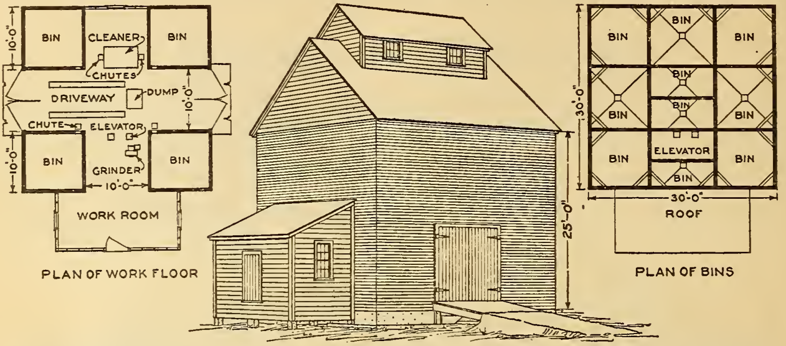

FIGURE 4.—Farm grain elevator of from 6,000 to 10,000 bushels capacity. The storage contains 10 bins with inside dump and elevator and space for cleaning and grinding machinery

Similiarly, it usually requires fewer men and trucks or teams to move the grain from a threshing machine to farm storage than it does to haul it to an elevator. If the grain is placed in storage on the farm at threshing time, it can be hauled later to the local market by the farmer himself, and thus the expense of the extra truck or wagon and hired help may be saved.

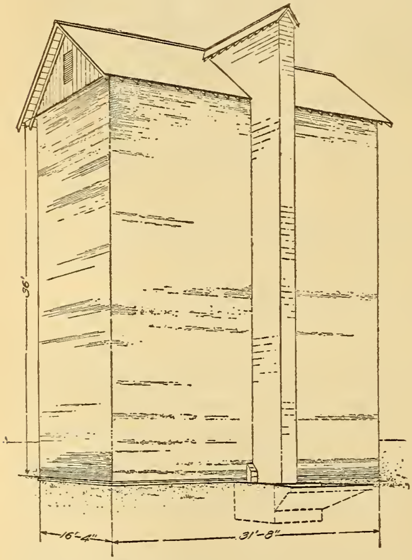

FIGURE 5.—Two-bin crib grain storage with outside dump and inclosed elevator. A shed for grinding and cleaning may be added

MAKES HOME CLEANING PROFITABLE

In areas in which the grain contains high percentages of dockage or other foreign material, as is usually the case in the spring-wheat area and in certain sections of the winter-wheat area, farm storage gives an opportunity to clean the grain on the farm and to sell only the clean grain. In such instances, cleaning the grain on the farm is profitable. The dockage or other foreign material removed from the grain, on the farm, is retained on the farm and can be profitably used for feed; less hauling is required; and the clean grain frequently brings a higher price than would be secured if the foreign material were allowed to remain in the grain.

By storing part of each new crop on the farm the marketing period is lengthened, and this in turn gives the country-elevator operator an opportunity to clean more of the grain that is received from farmers in an uncleaned condition. By cleaning the grain at the country elevator freight is saved on the dockage, for which no pay is received when combined grain and dockage reach the terminal markets; usually the dockage can be sold at the elevator for a good price, and a better price frequently can be obtained for the clean grain on the terminal market.

INSURES BETTER QUALITY

The difficulties that the country elevators and the railroads, and sometimes the terminal elevators, have in handling and moving the grain as fast as it is moved from the farms often mean that farmers who are not equipped with farm-storage facilities are compelled to pile their threshed grain on the ground. Grain that is piled on the ground often is spoiled by rains, and sometimes pebbles and earth become mixed with it when it is shoveled into the trucks or wagons at the time it is hauled away from the piles. Such grain frequently must be sold at a lower grade and for a lower price because of its high moisture content, or its spoiled condition, or because of the foreign material in it.

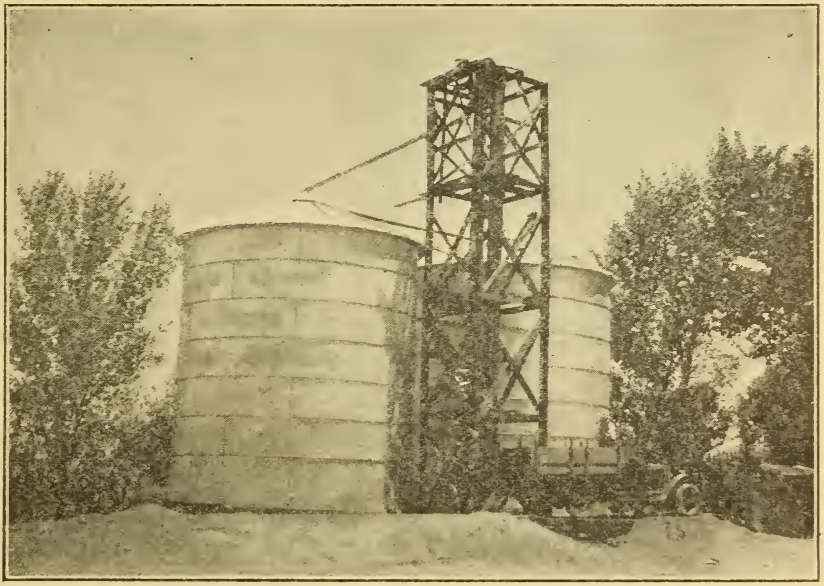

FIGURE 6.—Two metal bins with outside bucket elevator. This may be erected quickly to serve either as a temporary storage or as the beginning of a permanent structure. Other bins may be added and the elevator inclosed as shown in Figure 1

REDUCES LOSSES FROM DAMP GRAIN

Very large quantities of wheat and other grains arrive at the terminal markets each year in a cool condition, but fail to meet the requirements for the top grades on account of excess moisture content. In addition, large quantities of high-moisture grain arrive at the terminal markets each year in a musty, sour, or heating condition. Grain of the lower grades, as well as grain that is "out-of-condition," takes a discount when it is sold on the market, the discounts for "out-of-condition" grain being especially heavy. Excess moisture in the grain is the result of combining or threshing grain while it is in a damp or wet condition.

Damp grain usually can be avoided by delaying the combining or threshing until the grain is dry, and by immediately removing any damp weed seeds or other foreign matter that may be present in the threshed grain. However, where continued wet and stormy weather prevails during harvest time farmers sometimes have difficulty in delaying combining or threshing until the grain is thoroughly dry. If farm storage equipped with grain-elevating machinery is available, damp grain can be dried to a considerable extent by frequently transferring the grain from one bin to another during dry weather. If the grain contains only a slight excess of moisture, such grain can be dried in the bins by means of ventilators, if they are open at each end to the outside air and are spaced fairly close together in the grain. (Fig. 7.) By drying damp grain on the farm, spoiling of the grain is avoided and a higher price can be obtained for the grain when it is sold.

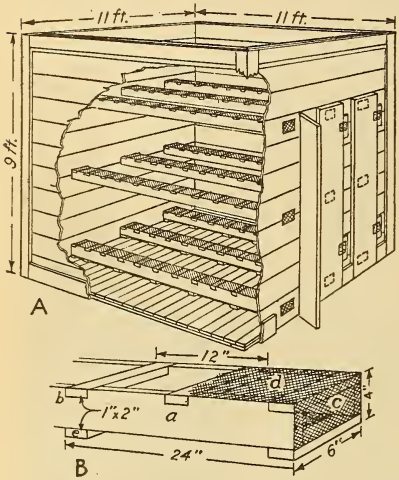

FIGURE 7.—Ventilated wheat bin: A.—View of ventilators in position in the bin. These are placed 20 inches apart in tiers. The tiers also are 20 inches apart, one above the other with openings in side of bin. The three doors, when closed, prevent circulation of air through the ventilators. B.—Detailed structure and dimensions of ventilator: *a*, Side of ventilator; *b*, cleat mortised in upper edge of *a*; *c*, wire screen over end of ventilator; *d*, wire screen covering top of ventilator; *e*, cleat nailed on bottom to hold the ventilator together and to raise it from floor

PROTEIN PREMIUMS

The payment of premiums for hard wheats of high protein content has come to be a standard practice at many of the interior terminal markets. Protein premiums now are being paid also direct to farmers at many of the country elevators located in the hard-red-winter and hard-red-spring wheat areas. These premiums are paid for wheat that has a protein content over a certain per cent. Although only small premiums are paid for wheat with a protein content only slightly in excess of the base percentage, the premiums that are paid for wheat of high protein content are at times very considerable.

During the harvesting period in any grain area the country-elevator operator often has considerable difficulty in handling the grain on a protein basis and usually must bin the wheat without reference to its protein content. The difficulty is occasioned by the large quantity of grain that the farmers haul to market during this period, and which must be taken into and shipped out of the elevators each day. The result of this rush marketing is that the elevator operators frequently do not attempt to buy wheat on a protein basis during this time.

If a considerable share of the wheat is put into farm storage at the time of threshing, the marketing season can be spread over a considerable period. While the wheat is in farm storage the farmer can obtain a protein test on his wheat and if the grain contains sufficient protein to entitle it to a premium it can be sent to the terminal market, identity preserved, or it can be hauled to the local elevator at some later date after the rush period is over, when the elevator operator has less grain to handle and is in position to store it with other wheat of similar protein content. Under these conditions the country-elevator operator is in position to pay the farmer the full premium to which his wheat is entitled.

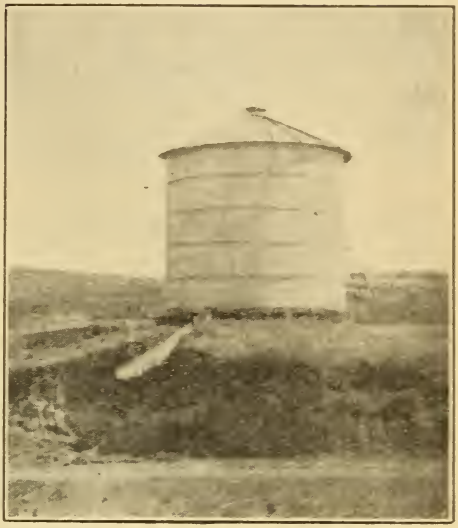

FIGURE 8.—A single-bin metal temporary grain storage resting on a heavy wooden platform. In this instance advantage was taken of a roadside cut to unload into wagons by means of a chute

GRAIN STORAGES

Grain storages may be portable or stationary, and may be of temporary or permanent construction. They may be built of any suitable material. The accompanying illustrations are suggestive of storages of different capacities and construction. Complete working drawings for the structures shown in Figures 2, 3, 4, and 5 may be had upon application to the Division of Agricultural Engineering, Bureau of Public Roads, United States Department of Agriculture, Washington, D. C.

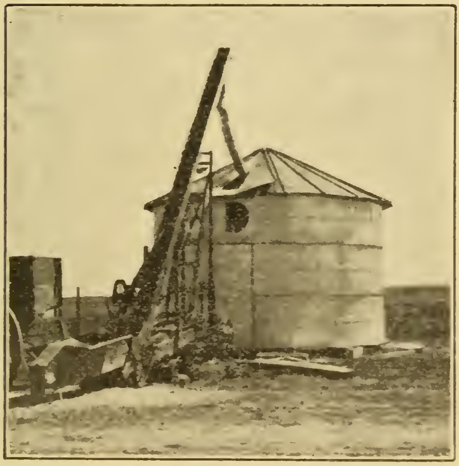

FIGURE 9.—Portable elevator used in filling a temporary storage bin in the field. A gas engine provides the power

All grain bins should be ventilated, unless the equipment is such that damp grain can be transferred from one bin to another to prevent it from heating while in storage. Figure 7 shows how a small storage bin can be ventilated. Similar equipment can be employed in any bin.

Figures 1, 6, and 8 show the use of metal grain bins which can be purchased from manufacturers of such equipment. Bucket elevators as shown in these illustrations, and portable elevators of which one type is illustrated in Figure 9, also may be purchased from manufacturers.

U. S. GOVERNMENT PRINTING OFFICE: 1929

For sale by the Superintendent of Documents, Washington, D. C. - - - - - - Price 5 cents